

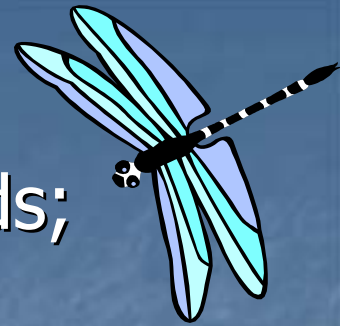


LACUSTRINE & LAKE FRINGE WETLANDS

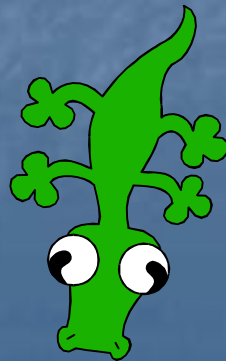


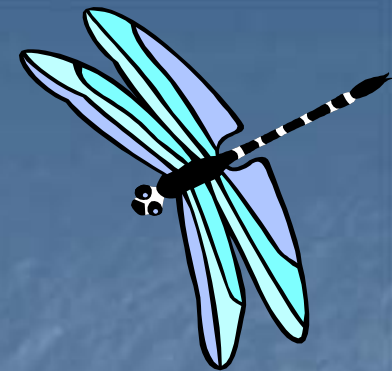
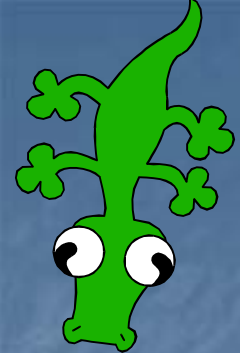
What's that ring of **green**
stuff around lakes?





1. Whether any part of lakes are wetlands;
2. The beneficial uses of lacustrine and lake fringe wetlands and how these may be disturbed by nuisance plant control;
3. The FSEIS requirements for wetland mitigation;
4. Thoughts on implementing the FSEIS requirements.





What is a wetland?

- State definition of wetlands (SMA/GMA):
Wetlands are “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands typically include swamps, marshes, bogs, and similar areas.”



What are Lacustrine (or Lake-Associated) Wetlands?

- Situated in topographic depression.
- Lack trees, shrubs or persistent emergents with $> 30\%$ areal coverage.
- Extends from the shoreward boundary of the system to a depth of 6.6 feet below low water or to the maximum extent of nonpersistent emergents, if these grow deeper than 6.6 feet.

WETLANDS AND DEEPWATER HABITATS

SYSTEM

SUBSYSTEM

CLASS

MARINE

SUBTIDAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Reef

INTERTIDAL

Aquatic Bed
Reef
Rocky Shore
Unclassified Shore

ESTUARINE

SUBTIDAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Reef

INTERTIDAL

Aquatic Bed
Reef
Streambed
Rocky Shore
Unclassified Shore
Emergent Wetland
Scrub-Shrub Wetland
Forested Wetland

RIVERINE

TIDAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Streamland
Rocky Shore
Unclassified Shore
Emergent Wetland

LOWER PERENNIAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Rocky Shore
Unclassified Shore
Emergent Wetland

UPPER PERENNIAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Rocky Shore
Unclassified Shore

INTERMITTENT

Streambed

LACUSTRINE

LIMNETIC

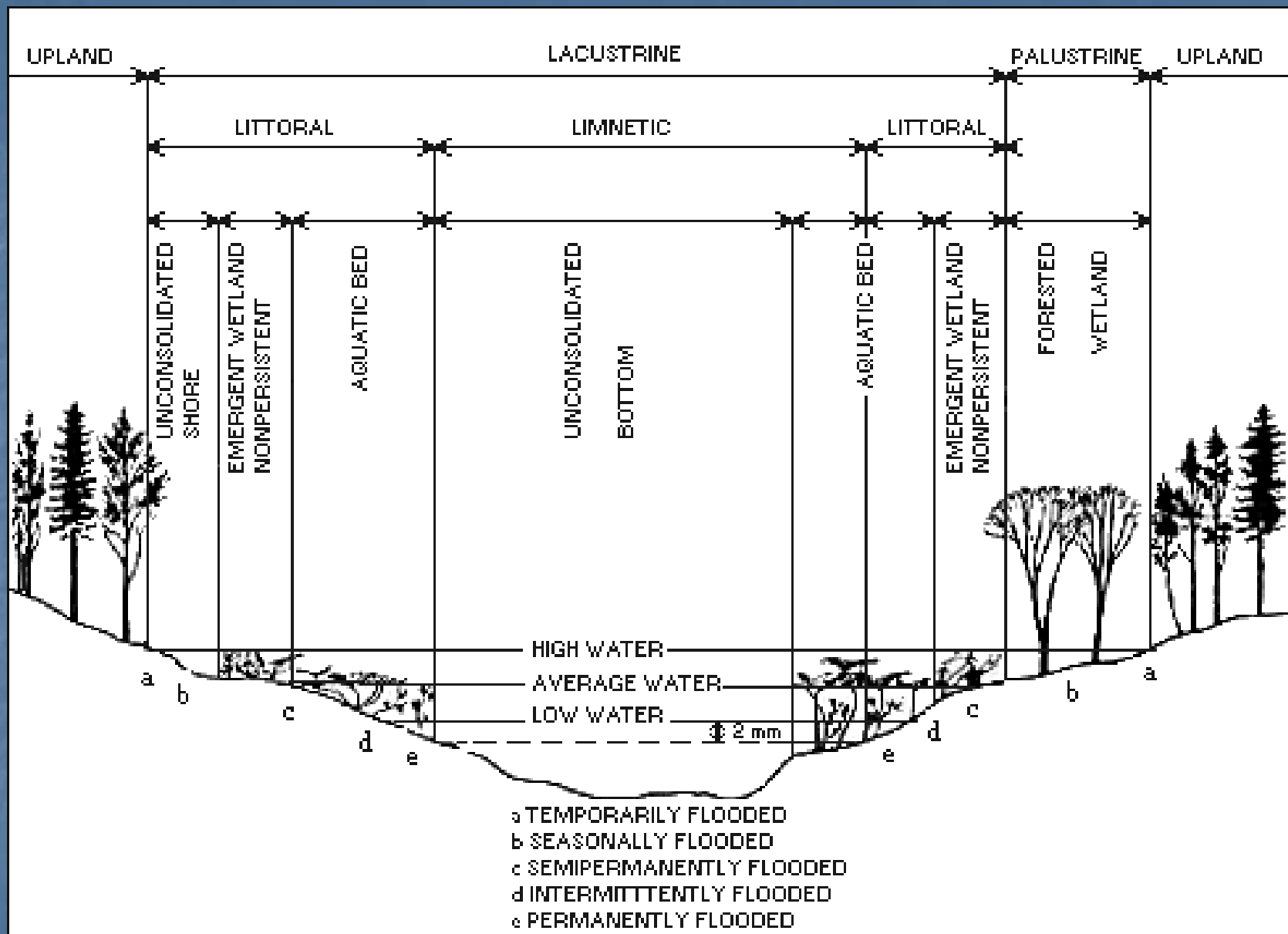
Rock Bottom
Unclassified Bottom
Aquatic Bed

LITTORAL

Rock Bottom
Unclassified Bottom
Aquatic Bed
Rocky Shore
Unclassified Shore
Emergent Wetland

PALUSTRINE

Rock Bottom
Unclassified Bottom
Aquatic Bed
Unclassified Shore
Moss-Lichen Wetland
Emergent Wetland
Scrub-Shrub Wetland
Forested Wetland



What are lake-fringe wetlands?

- Wetlands that occur around the edges of a lake (palustrine in Cowardin).
- May include cattail (*Typha* spp.), bulrush (*Scirpus* spp.)- “persistent emergent” vegetation meaning coming up out of water & lasting until start of next growing season.







Characteristic and Beneficial Uses

- Chapter 173-201A-030 WAC (General water use and criteria classes in State water quality Standards).
- RCW 90.48.020 (“...or other legitimate beneficial uses...”)
- Chapter 173-201A-070 WAC (Antidegradation)
- Ecology Publication #96-06, *Water Quality Guidelines for Wetlands*. Pages 4-6.

Ecological benefits provided by lake associated & lake-fringe wetlands:

- Potential for removing sediment
- Potential for removing nutrients
- Potential for removing toxic metals and toxic organic compounds
- General habitat suitability
- Habitat for invertebrates

Invertebrates? So what?

- Base of the aquatic food chain.
- Provide critical protein waterfowl need for egg laying and development of young.
- If preferred prey organisms are unavailable, foraging will be less effective and populations of fish, waterfowl, and amphibians may suffer.

Energy Content of Food Organisms in Castle Lake, Northern California

Food Organism	Calories Per Gram of Ash-Free Dry Weight	Number Per 1,000 Calories
Dragonfly nymphs	5,514 +/- 285	15
Beetles	5,738 +/- 596	26
Ants	5,808 +/- 319	70
Damselfly nymphs	5,374 +/- 125	85
Midge larvae/pupae	5,542 +/- 104	759
Caddisfly larvae	4,409 +/- 871	1,000
Snails	3,484 +/- 229	229

(From Cordes and Kaufmann, Lake Fishing With A Fly. Frank Amato Publications:
Portland, Oregon. 1984.)

Ecological benefits provided by lake-associated & lake-fringe wetlands:

(continued)

- Habitat for anadromous and resident fish
- Habitat for wetland-associated birds
- Habitat for wetland-associated mammals
- Native plant richness
- Shoreline stabilization



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How does nuisance plant control effect these ecological functions?

Direct Effects:

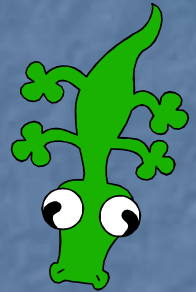
- Adverse effects to non-target aquatic vegetation (*Lemna*, *Typha* and *Scirpus* spp.)





How does nuisance plant control effect these ecological functions?

Direct Effects (continued):



- Changes to invertebrate cellular and cuticular structure—interferes with fitness, life history timing, ability to feed, obtain oxygen, or reproduce.

How does nuisance plant control effect these ecological functions?

Indirect Effects:

- removal of plant food source, epiphytic algae food source, egg-laying sites, refuge sites, direct and indirect oxygen supply (Invertebrates).
- As resources become limited (food or oxygen), abundance declines, growth slows and life history timing is altered (Invertebrates).



How does nuisance plant control effect these ecological functions?

Indirect Effects (continued):

- Increase of organic litter shifts invertebrate community towards benthic feeders and their predators.
- Decomposition of dead plant material leads to low oxygen concentrations.

How does nuisance plant control effect these ecological functions?

Indirect Effects (continued):

- Fragmentation or minimization of avian habitat
- Lowered abundance of some avian species
- Opens up area for noxious weed colonization

How does nuisance plant control effect these ecological functions?

- Lake ecosystem shift; from macrophytic plants -> microscopic plants (algae and blue-green algae); sets up cycle of unwanted algal blooms

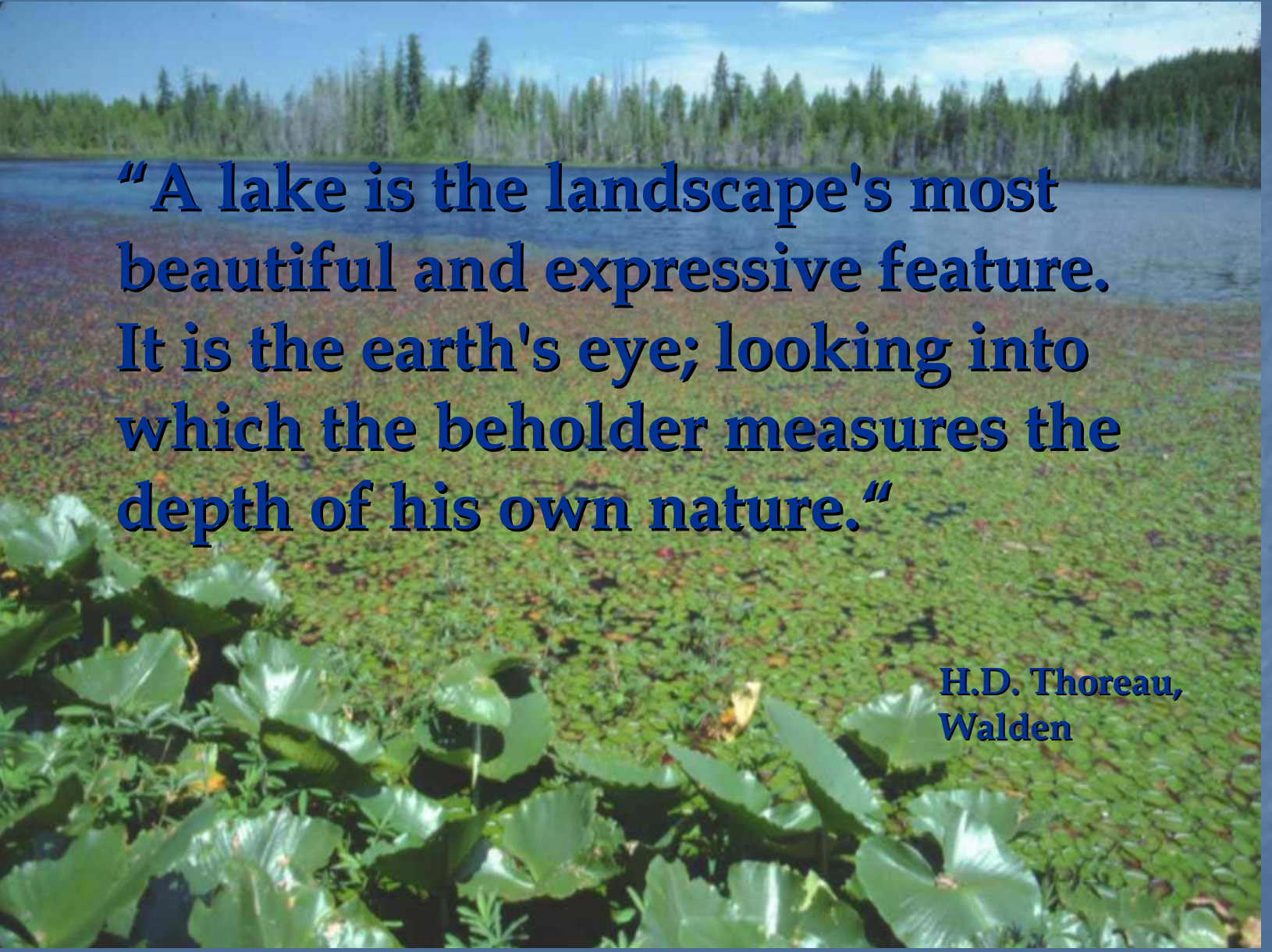




What other beneficial uses are provided by lacustrine wetlands?

- Recreational (canoeing, birding, photography)
- Aesthetics



A photograph of a serene lake scene. In the foreground, there are large, green lily pads floating on the water. The middle ground shows a calm body of water reflecting the sky. In the background, a dense forest of tall evergreen trees lines the shore under a blue sky with light clouds.

“A lake is the landscape's most beautiful and expressive feature. It is the earth's eye; looking into which the beholder measures the depth of his own nature.”

**H.D. Thoreau,
Walden**

Is This a New Concern?

Quantitative impact comparison:

- For only the NWRO in the 2001 application season, Ecology received herbicide applications for appx. 580 acres of native wetland plants
- For the entire year of 2001 in the NWRO, Ecology only permitted appx. 12.34 acres of wetland fill/other impacts (under indiv. 401s*)

FSEIS for Freshwater Aquatic Plant Management- Wetlands

Provides guidance for decisions regarding wetlands mitigation (pages 12-14):

- Water quality in “exceptional wetlands” shall be maintained & protected.
- Water quality in all other wetlands shall be maintained & protected unless impact is unavoidable & necessary.
- When impact is unavoidable & necessary, and has been minimized to maximum extent, wetland losses and degradation shall be offset.

Moving Forward From Here...

Possible recommendations on how FSEIS can be implemented with respect to wetland mitigation:

- Only spray a portion of all contiguous aquatic bed/emergent areas.



8/26/97

Moving Forward From Here...

Possible recommendations on how FSEIS can be implemented with respect to wetland mitigation:

- No spray zones for protection of peat habitats, or other sensitive areas.



Moving Forward From Here...

- Allowing spraying every other year or less frequently.
- Requiring mechanical removal.
- Providing an acceptable Lake Management Plan which should include long range protection of wetlands.
- Require wetland vegetation or other biological monitoring.
- Compensation for unavoidable impacts.

Compensation

- Revegetating disturbed section of shoreline.
- Wetland creation or restoration.
- Placing perching and nesting structures.
- Preserving (in perpetuity) lakefront wetland area.

Ecology Wetland Contacts for **Lacustrine Issues**

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Questions?